

REMARKS

Claims 1-4 and 6-10 are all the claims pending in the application.

Claim 8 has been rejected under the second paragraph of 35 U.S.C. § 112 as indefinite because it is unclear how the term “general” limits the depicted formula.

This rejection is the same as in the previous Office Action. Applicants had intended to amend claim 8 to delete the term “general,” but inadvertently did not do so in the Amendment that was filed on October 8, 2010. Applicants have now amended claim 8 to delete the term “general.”

Claims 1-4 and 6-10 have been rejected under 35 U.S.C. § 103(a) as obvious over JP 2001-348566 for reasons of record.

Applicants submit that JP ‘566 does not disclose or render obvious the subject matter of the presently claimed invention and, accordingly, request withdrawal of this rejection.

The Examiner states that JP ‘556 discloses thermosetting resin compositions comprising a polyimide, an epoxy, a hardening accelerator and a curing agent. The Examiner refers, for example, to Inventive Examples 23 and 36 which, according to the Examiner illustrate compositions comprising a polyimide, an epoxy resin, a tetramine accelerator and a diamine curing agent are illustrated.

The Examiner argues that it would have been obvious to one having ordinary skill in the art, and within the disclosure of the reference, to have used an imidazole in lieu of the exemplified tetramine hardening accelerator with a reasonable expectation of success.

The Examiner states that JP '556 clearly teaches that imidazole compounds can be used in place of or in addition to the exemplified tetramine hardening accelerator, that is, they are taught as equivalent hardening accelerator materials, as disclosed in paragraph [0049] of the computer translation. The Examiner asserts that since the composition of JP '556 would be chemically similar to applicants' and further is capable of being laminated at relatively low temperatures (inclusive of that presently claimed), it would be reasonably expected that the former would meet the flowability properties governing the latter.

In response, applicants first note that they disagree as to how the Examiner has characterized the Examples of JP '556.

In particular, the Examiner refers to Examples 23 and 36 of JP '566. However, JP '566 does not contain Examples 23 and 36. Applicants believe the Examiner intended to refer to EP 1 281 727 which applicants submitted with the Information Disclosure Statement of October 2, 2009 and which corresponds in part to JP '566. Applicants believe that Examples 23 and 36 of EP 1 281 727 correspond to Examples 3 and 16 of JP '556.

Applicants submit that JP '556 does not disclose or render obvious the recitation of claim 1 that the thermosetting resin composition is in a semi-cured state and has a minimum melt viscosity in the range of 100 poise to 50,000 poise in the temperature range of 60°C to 200°C. The minimum melt viscosity of the resin is a measure of the resin flowability. See paragraph [0145] of applicants' published US 2008/0230261 corresponding to the present application.

JP '556 is silent about the minimum melt viscosity of the semi-cured composition. JP '556 discloses a composition comprising (A) a polyimide resin component and (C) an epoxy resin component in its claim 1. However, regarding (B) an amine component or (D) an imidazole component, these components are just described in the broad disclosure of JP '566 as an example of a curing agent or a curing accelerator. JP '556 does not disclose a specific combination of these components explicitly and the amount of these components.

On the contrary, the present inventors found a specific combination that exceptionally shows a low melt viscosity at a temperature of lamination. Applicants submit that one of ordinary skill in the art would not have been led to select two components from a curing agent or a curing accelerator for the epoxy resin, especially when the epoxy resin is used with a polyimide resin. It is required that both two components are adequately selected in terms of a compatibility with the polyimide resin.

Starting from JP '556, which is silent about flowability and dielectric characteristics, in order to arrive at the present invention, it would have been necessary to select the specific combination, confirm its melt viscosity in semi-cured state and confirm the dielectric characteristics of the cured product to achieve the present invention. Applicants submit that such a course of action could only be achieved by hindsight reasoning and that the present invention is not obvious.

The Examiner takes the position that the composition of the present invention is rendered obvious by in JP '556 based on Example 23 and 36 [in EP 1281727] (corresponding to Example

3 and 16 in JP '556, and paragraph [0049] of JP '556, and therefore, the composition of JP '556 is capable of being laminated at relatively low temperatures.

However, in fact, all of the compositions disclosed in the Examples of JP '556 do not show the same properties as the present invention. Applicants have found that in order to obtain a composition that has the minimum melt viscosity that is set forth in the present claims, the mixing ratio of the components $(A)/[(B) + (C)]$ should be controlled to a certain range. JP '556 does not disclose or suggest controlling the mixing ratio to obtain the minimum melt viscosity that is set forth in claim 1.

Applicants point out that resin compositions can be made from the same components as set forth in the present claims, but not achieve the minimum melt viscosity of claim 1 as a result of not having a mixing ratio sufficient to achieve the minimum melt viscosity of claim 1. In support of this position, applicants refer the Examiner to Tables 1 and 3 of the present specification which show that Examples 1 to 3 of the present application achieved a minimum melt viscosity within the scope of claim 1 in comparison to Examples 6 and 7 of the present application which employed the exact same components as Examples 1 to 3, but which did not achieve the minimum melt viscosity of claim 1. As shown in Table 1, Examples 1 to 3 had a mixing ratio within the scope of claim 2, but Example 6 had a higher mixing ratio and Example 7 had a lower mixing ratio. The minimum melt viscosities of the Examples are shown in Table 3.

In JP '566, as can be seen from the Examples in Table 3 of EP 1281727, which correspond to the Examples in Tables 1 and 2 of JP '566, the total content of the amine

component (B) and the epoxy resin component (C) to polyimide resin component (A) of JP '566 is extremely low compared to the present invention, resulting in a mixing ratio that far exceeds the upper value of 2 of the ratio of claim 2 of the present application. In this regard, the invention defined in claim 2 sets forth a specific ratio of components (A), (B) and (C) that provides a composition and a cured resin with sufficient adhesiveness (i), processability and handleability (ii), heat resistance (iii), resin flowability (iv), and dielectric characteristics (v), and a good balance among these characteristics. See paragraph [0031] of applicants' published US 2008/0230261 corresponding to the present application.

More specifically, when the mixing ratio exceeds 2.0, i.e., when the content of the polyimide resin component (A) is increased relative to the total content of the amine component (B) and the epoxy resin component (C), good dielectric characteristics (v) can be achieved. However, the composition may not always have sufficient adhesiveness (i), processability and handleability (ii), and resin flowability (iv) (as determined by the minimum melt viscosity). This tendency can be seen by comparing Example 6 of the present specification which had a mixing ratio in excess of 2, but which did not have good resin flowability, to the other Examples or by comparing Comparative Example 2 to the other Comparative Examples. Therefore, the compositions disclosed in JP '556 which far exceed the upper limit of the ratio set forth in claim 2 can not have good properties at least in resin flowability as the present invention.

Further, the present inventors have found that the component (D) can contribute to decreasing the minimum melt viscosity of the composition and that the minimum melt viscosity

can also be adjusted by the mixing ratio for the components (A) to (C), both of which are not disclosed in JP '556. With respect to the effect of component (D), it is apparent from the comparison between Example 1 and Comparative Example 1, or Example 6 and Comparative Example 2, or Example 7 and Comparative Example 3 of the present application.

Accordingly, the composition in JP '556 can not have low minimum melt viscosity as set forth in claim 1. Further, JP '556 is silent about the effects of adding component (D), and is silent about setting the mixing ratio of component (A) to (C) to the specific range set forth in claim 2. Therefore, JP '556 does not disclose or suggest the composition defined in the present claim 1.

In view of the above, applicants submit that JP '566 does not disclose or render obvious the subject matter of the presently claimed invention and, accordingly, request withdrawal of this rejection.

Applicants' undersigned counsel outlined the above arguments during a telephone interview with the Examiner, Ms. Woodward, on July 2, 2010. The Examiner stated that she would consider the arguments upon the filing of a written response. No agreement was reached with the Examiner during the interview. The above discussion of the telephone interview constitutes a Statement of Substance of Interview.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the


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Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,


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